

# Report - Kua Coffee Carbon Assessment

**Period of Measurement:** 1 July 2021 - 31 Dec 2022

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**Completed On:** 28th March 2023

**Type of Assessment:** Corporate Value Chain Scope 3 Assessment

**Reporting Standards:** [GHG Protocol Corporate Accounting and Reporting Standard](#) and [GHG Protocol Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard](#).

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## 1. Greenhouse Gas (GHG) Protocol Standards Overview

This report has been prepared in accordance with the GHG Protocol Corporate Accounting and Reporting Standard and GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

**This GHG Protocol Corporate Standard provides standards and guidance for companies and other types of organisations preparing a GHG emissions inventory.** It covers the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol—carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>). The standard and guidance were designed with the following objectives in mind:

- To help companies prepare a GHG inventory that represents a true and fair account of their Scope 1 and 2 emissions, through the use of standardised approaches and principles.
- To simplify and reduce the costs of compiling a GHG inventory.
- To provide business with information that can be used to build an effective strategy to manage and reduce GHG emissions.
- To provide information that facilitates participation in voluntary and mandatory GHG programs.
- To increase consistency and transparency in GHG accounting and reporting among various companies and GHG programs.

**In addition, the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard provides requirements and guidance to prepare and publicly report a GHG emissions inventory that includes indirect emissions resulting from value chain activities.** The primary goal of this standard is to provide a standardised step-by-step approach to help companies understand their full value chain emissions impact in order to focus company efforts on the greatest GHG reduction opportunities, leading to more sustainable decisions about companies' activities and the products they buy, sell, and produce. The standard was developed with the following objectives in mind:

- To help companies prepare a true and fair Scope 3 GHG inventory in a cost-effective manner, through the use of standardised approaches and principles.
- To help companies develop effective strategies for managing and reducing their Scope 3 emissions through an understanding of value chain emissions and associated risks and opportunities.
- To support consistent and transparent public reporting of corporate value chain emissions according to a standardised set of reporting requirements.

In short, the GHG Protocol Corporate Accounting and Reporting Standard focuses primarily on Scope 1 and 2 emissions while the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard focuses on Scope 3 emissions.

Scope 1 and 2 emissions are typically considered 'operational emissions', while Scope 3 emissions are considered 'value chain emissions'. As such, combining these two standards allowed Kua to develop an emissions inventory that accurately and comprehensively represents its carbon footprint.

## 2. Key Principles

GHG Protocol accounting and reporting shall be based on the following principles:

- **Relevance:** Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users – both internal and external to the company.
- **Completeness:** Account for and report on all GHG emission sources and activities within the inventory boundary. Disclose and justify any specific exclusions.
- **Consistency:** Use consistent methodologies to allow for meaningful performance tracking of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.
- **Transparency:** Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.
- **Accuracy:** Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information.

### 3. Goals of Assessment

**Kua assesses its carbon footprint to 1) better understand its environmental impact and 2) to take responsibility for it.** A Scope 1, 2 and 3 inventory requires Kua to map its entire value chain emissions, allowing it to identify GHG hot spots and implement reduction activities year on year. In recognition of the climate emergency, where reductions are not possible, offsets are purchased at 2 x the total tonnes of Carbon Dioxide Equivalent (CO<sub>2</sub>e) emissions for any given Period of Measurement (PoM).

### 4. Period of Measurement

**The data referenced throughout this report is for PoM July 1 2021 - December 30 2022 (18 months).** While Kua has historically reported on an annual basis, the PoM was extended for this assessment due to the handover of the business to Commonfolk Coffee Company Pty Ltd (Commonfolk). The next assessment will be conducted by Commonfolk in early 2024 and will capture data from PoM 1st January 2023 - 30 December 2023 (12 months).

## 5. Value Chain Map

CO2 CH4 N2O HFCs PFCs SF6 Emissions		
↑	↑	↑
UPSTREAM <i>Scope 3 (Indirect)</i>	REPORTING COMPANY <i>Scope 1 (Direct)</i>	DOWNSTREAM <i>Scope 3 (Indirect)</i>
Green Coffee Production	Roasting	Delivery (Bagged)
Shipping	Packaging (Drums)	Delivery (Drums)
Warehousing and Order Fulfilment <i>(Also includes Scope 2 Indirect)</i>	Packaging (Bags)	Equipment / Coffee Machines
Office		Coffee Grounds Diverted
Services		
Staff		
Merchandise		

## 6. Emissions Inventory

Value Chain Category	Scope	Description of Activities
<b>Green Coffee Production</b>	3	<p>Kua's green coffee purchased during PoM to be roasted. Includes:</p> <ul style="list-style-type: none"> <li>- The establishment phase per year of lifetime (20 years): the clearing of the orchard (including waste treatment). Tree nursery, soil cultivation, planting trees, installation of trellis system (posts and wires) and irrigation. Fertiliser and pesticide use in the establishment phase.</li> <li>- The productive phase of the orchard: machine operations, corresponding infrastructure, fuel use and sheds. Machine operations in the productive phase: soil cultivation (mulching, mowing), fertiliser and pesticide application, harvesting and irrigation.</li> <li>- The end of the productive phase: direct field emissions and land use change.</li> <li>- The inputs of seedlings, fertilisers and pesticides as well as packaging of fertilisers and pesticides.</li> <li>- The processing of green beans: coffee beans dried using wood as a fuel.</li> <li>- Heavy metal uptake by the crop.</li> <li>- Biogenic emissions (i.e CO2 emissions from the combustion or biodegradation of biomass).</li> </ul>
<b>Shipping</b>	3	<p>The shipment of Kua's green coffee from Uganda, to Sydney, via Melbourne. Includes:</p> <ul style="list-style-type: none"> <li>- The transportation and distribution of green coffee purchased by the reporting company between tier 1 suppliers (Zukuka Bora &amp; Kyagalanyi Coffee) and its own operations (vehicles and facilities not owned or controlled by the reporting company).</li> <li>- The Scope 1 and Scope 2 emissions of transportation and distribution providers that occur during use of vehicles and facilities (e.g., from energy use) and the life cycle emissions associated with manufacturing vehicles, facilities, or infrastructure.</li> </ul>
<b>Roasting</b>	1	<p>The roasting (production of the product) including:</p> <ul style="list-style-type: none"> <li>- Electricity and gas use: Including All upstream (cradle-to-gate) emissions of purchased fuels (from raw material extraction up to the point of, but excluding combustion).</li> <li>- The Scope 1 and Scope 2 emissions of transportation during use of vehicles to transport roasted coffee between Kua's own facilities (in vehicles and facilities not owned or controlled by Kua) including the life cycle emissions associated with manufacturing those vehicles.</li> </ul>
<b>Warehousing</b>	1,2	Shed operations, energy use in shed and storage/warehousing of coffee.

<b>and Order Fulfilment</b>		<p>Includes:</p> <ul style="list-style-type: none"> <li>- Emissions from the generation of purchased energy.</li> <li>- Energy transmission and Distribution losses: All upstream (cradle-to-gate) emissions of energy consumed in a T&amp;D system, including emissions from combustion.</li> <li>- Leased warehouse Scope 1 and Scope 2 emissions that occur during the reporting company's operation of leased assets (e.g., from energy use).</li> </ul>
<b>Packaging (Drums)</b>	1	<p>The production of drums and washing of drums. Includes:</p> <ul style="list-style-type: none"> <li>- Plastic manufacture Scope 1, 2 and 3 emissions. Eg: Petrochemicals, electricity and inbound distribution.</li> <li>- Production and use of water for washing Scope 1 and 2 emissions.</li> </ul>
<b>Packaging (Bagged)</b>	1	<p>The production of bags, boxes and tape. Includes:</p> <ul style="list-style-type: none"> <li>- Bag production Scope 1 and 2 emissions.</li> <li>- Box production Scope 1, 2 and 3 emissions.</li> <li>- Tape production Scope 1, 2 and 3 emissions.</li> </ul>
<b>Office</b>	3	<p>Office water and electricity, printing, groceries, gifts, cleaning and laundry, sundry (inc. trolleys, bins, tubs, stationary, takeaway cups). Includes:</p> <ul style="list-style-type: none"> <li>- Leased office space Scope 1 and Scope 2 emissions of lessors that occur during the reporting company's operation.</li> <li>- Production and use of water Scope 1 and 2 emissions.</li> <li>- Emissions from the generation of purchased energy.</li> <li>- Upstream (cradle-to-gate) emissions of purchased goods (trolleys, tubs, stationary, etc.)</li> <li>- Upstream (cradle-to-gate) emissions of purchased services (cleaning).</li> </ul>
<b>Services</b>	3	<p>The Kua technology stack, admin, legal and accounting services, other consulting, and insurance. Includes:</p> <ul style="list-style-type: none"> <li>- All upstream (cradle-to-gate) emissions of purchased services (eg: upstream emissions of legal consulting).</li> <li>- All upstream emissions of purchased technology.</li> </ul>
<b>Staff</b>	3	<p>Staff commute, staff travel, staff entertainment and meals. Includes:</p> <ul style="list-style-type: none"> <li>- All upstream (cradle-to-gate) emissions of purchased goods and services (eg: staff meals at restaurants).</li> <li>- The Scope 1 and Scope 2 emissions of transportation carriers that occur during use of vehicles (e.g., from energy use) for staff travel.</li> </ul>

		<ul style="list-style-type: none"> <li>- The life cycle emissions associated with manufacturing vehicles for staff travel.</li> <li>- The Scope 1 and Scope 2 emissions of employees and transportation providers that occur during use of vehicles (e.g., from energy use).</li> <li>- Emissions from employee teleworking (via account for emissions of all employees working full time from office).</li> </ul>
<b>Merchandise</b>	3	<p>Custom mug production for resale, custom t-shirt production for resale, custom apron production for resale. Includes:</p> <ul style="list-style-type: none"> <li>- All upstream (cradle-to-gate) emissions of purchased capital goods (mugs, tees &amp; aprons).</li> </ul>
<b>Delivery (Drummed)</b>	3	<p>Delivery of Kua coffee in hired van. Includes:</p> <ul style="list-style-type: none"> <li>- The Scope 1 and Scope 2 emissions of transportation and distribution providers that occur during use of vehicles and facilities.</li> <li>- The life cycle emissions associated with manufacturing vehicles.</li> </ul>
<b>Delivery (Bagged)</b>	3	<p>Deliveries of all bagged coffee via post / courier. Includes:</p> <ul style="list-style-type: none"> <li>- The Scope 1 and Scope 2 emissions of transportation providers, that occur during use of vehicles and facilities (e.g from energy use).</li> </ul>
<b>Equipment / Coffee Machines</b>	3	<p>Coffee grinders and machines rented and sold to Kua customers and their servicing, installation and parts. Includes:</p> <ul style="list-style-type: none"> <li>- All upstream (cradle-to-gate) emissions of purchased coffee machines, grinders and parts.</li> <li>- All upstream (cradle-to-gate) emissions of services (eg: installation)</li> </ul> <p>Exclusions disclosed and justified in Section 7.</p>
<b>Coffee Grounds Diverted</b>	3	<p>Coffee grounds from Sydney and select interstate customers collected and diverted from landfill:</p> <ul style="list-style-type: none"> <li>- The Scope 1 and Scope 2 emissions of Kua collecting and delivering Sydney coffee grounds to a central collection point during the PoM. Accounted for via Office for resources, and Delivery (drums) for collection (due to nature of circular model).</li> </ul> <p>Exclusions disclosed and justified in Section 7.</p>

## 7. Exclusions

Related Value Chain Category	Exclusion Description	Justification
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<p>Equipment / Coffee Machines</p>	<p>As per the Standard, a complete account must include the direct use-phase emissions of sold products over their expected lifetime (i.e. the Scope 1 and Scope 2 emissions of end users that occur from the use of products that directly consume energy (fuels or electricity) during use).</p> <p>While we have accounted for Scope 1 and 2 Emissions for all coffee machines purchased by Kua during the PoM, Scope 1 and Scope 2 emissions of end users using the machines eg: their electricity use in the office has not been included.</p>	<ol style="list-style-type: none"> <li>1. Internal resources: This activity exists on the fringe of project Scope and due to limited team availability and project timeframes were excluded or deprioritised.</li> <li>2. Data availability: Kua has limited access to data on the use of coffee machines bought or leased by companies. This makes the calculation of electricity consumption extremely difficult and prone to inaccuracy.</li> <li>3. Indirect: In some cases Kua facilitated the sale of equipment (i.e Kua never owned the assets, it only acted as a 'middleman') hence has little oversight on usage.</li> </ol>
<p>Coffee Grounds Diverted</p>	<p>As per the Standard, a complete account must include the Scope 1 and Scope 2 emissions of waste management companies that occur during disposal or treatment of sold products.</p> <p>While we have accounted for the Scope 1 and Scope 2 emissions of Kua collecting and delivering Sydney coffee grounds to a central collection point during the PoM, we did not account for interstate waste collection or disposal or Sydney waste collection disposal.</p> <p>As such, biogenic CO2 emissions for coffee ground diversion have not been calculated.</p>	<ol style="list-style-type: none"> <li>1. Data Gap: Due to a gap in the source data these emissions were omitted.</li> <li>2. Inaccuracy: Due to the data gap (above) and fluctuation of waste contractor operations this data has high levels of variability and is prone to inaccuracy.</li> </ol>

**8. Data Collection**

For each value chain category listed in the emissions inventory above, data was collected in the Data Collection tab of the [Data CarbonAssessment July21/Dec22 spreadsheet](#). In the Data Collection tab, a description of the type and source of data as well as details on the method of collection is noted. For each line of data, five quality indicators (technological representativeness, temporal representativeness, geographical representativeness, completeness and reliability) were scored as poor, fair, good or very good as per Box 7.2 in Chapter 7 of the Standard.

**9. Calculation**

For each activity listed in the emissions inventory above, CO2e emissions were calculated in Earthster.



Earthster is a web-based software platform designed for conducting life cycle assessments (LCAs) of products, processes, and systems. It was developed by the Earthster Project, a collaborative effort between industry, academia, and non-profit organisations and was recommended to Kua by advisor Dr Gregory Norris (Director at Sustainability and Health Initiative for NetPositive Enterprise (SHINE) at MIT).

Earthster allows users to input data for each stage of a product's life cycle, including raw material extraction, production, transportation, use, and disposal. The platform then calculates the environmental impacts associated with each stage, such as greenhouse gas emissions, water use, and land use.

**Earthster draws primarily from two databases: U.S. Substitutional and Environmental Input-Output (USSEIO) and Ecoinvent.**

The USSEIO database contains information on the inputs and outputs of the U.S. economy, providing detailed information on the materials, energy, and other inputs that are required to produce goods and services, as well as the environmental impacts associated with those inputs. While it is generally accepted as a valuable source for conducting LCAs, it must be noted that its focus on the U.S economy means it is not as exacting as other sources (i.e it may not represent the specific environmental impacts of products or processes in other countries or regions). However, given the similarities between the U.S and Australia, Dr Gregory Norris has assured it is suitable for this assessment.

The second database that Earthster draws from is Ecoinvent. Like USSEIO, Ecoinvent is a prominent life cycle inventory (LCI) database that provides data on the environmental impacts associated with various products, materials, and processes. It was developed by the Swiss Centre for Life Cycle Inventories and is widely recognised for its high quality and consistency. Unlike USSEIO, Ecoinvent includes data from several different countries and regions, allowing for more accurate analysis.

Each activity listed in the emissions inventory has been linked to a specific Process Reference in Earthster and in the [Data\\_CarbonAssessment\\_July21/Dec22](#) so calculations can be easily traced. For each activity, the Co2e emissions were calculated for one unit in Earthster and then multiplied in the [Data\\_CarbonAssessment\\_July21/Dec22](#) to determine the total for the PoM.

## 10. Results

**Total results from the Calculation process (simplified into Value Chain Categories in Results tab in [Data\\_CarbonAssessment\\_July21/Dec22](#)).**

Activities	Actual Emissions for PoM (kgCO2e)	Inclusions / Notes
Green Coffee Production	149432.40	Purchasing green coffee.
Shipping	13721.69	Land transport in Uganda and water shipping.
Roasting	3738.12	Roasting and transport of roasted coffee.
Warehousing and Order Fulfilment	7588.60	Shed operations and storage of coffee.
Packaging (Drums)	88.85	Drums.
Packaging (Bagged)	17813.70	Bags, boxes and tape.
Office	18044.18	The Commons water and electricity, printing, groceries, gifts, cleaning and laundry, sundry (inc. trolleys, bins, tubs, stationary, takeaway cups).

Services	4147.27	Tech stack, admin, legal, accounting, consulting, insurance.
Staff	4161.44	Commute, travel, entertainment and meals (accounting for offsets at point of purchase for flights).
Merchandise	3004.88	Mugs, tees and aprons.
Delivery (Drummed)	1024.14	Van deliveries.
Delivery (Bagged)	5389.15	Postal deliveries (accounting for offsets at point of purchase for all providers).
Equipment / Coffee Machines	39850.05	Coffee machines, grinders, servicing, installation and parts.
<b>Totals</b>		
<b>Total Actual Emissions for PoM (kg CO2e)</b>	268,004.47	
<b>Total Adjusted Emissions for PoM (kg CO2e)</b>	260,958.03	Adjusted to account for emissions offset at point of purchase (POP).
<b>Total Adjusted Emissions for PoM (T CO2e) 200% Offset</b>	521.92	Figure to purchase offsets for (x 2 Total Adjusted Emissions for PoM (T CO2e)).

**Per Kilogram Results:**

Calculating Per Kilogram Results for both Drum and Bagged products is separate to the GHG Protocol requirements. Kua calculates them as a tool for communication and understanding. Per Kilogram Results allow Kua staff and customers to easily digest the footprint of a product, and the activities which contribute to it.

**11. Uncertainty**

Category of Uncertainty	Description of Category	Notes for Kua Assessment
Parameter	Parameter uncertainty is uncertainty regarding whether a value used in the inventory accurately represents the activity in the company's value chain.	<p>In nearly all cases, the values used in the inventory accurately represent the activity in Kua's value chain. Data quality mostly scored as Very Good as per the indicator in Box 7.2 (recorded in <a href="#">Data CarbonAssessment July21/Dec22</a>).</p> <p>However, in some cases, when values are converted into emissions, overestimation due to the processes available on USSEIO and Ecoinvent has been observed.</p> <p>Examples:</p> <ol style="list-style-type: none"> <li>1. Kua often makes decisions to purchase 'eco' alternatives to mainstream products in its value chain (i.e compostable bags vs plastic bags for coffee packaging)</li> </ol>

		<p>or local Australian cardboard boxes made from recycled materials vs virgin cardboard boxes manufactured overseas) but processes are only available for the mainstream equivalent in Earthster which represent a higher footprint.</p> <p>2. The emissions factors for Green Coffee Production is derived from an Ecoinvent dataset. The per kilogram CO2e figure for green coffee is a weighted average of regional datasets from Honduras, Colombia, Brazil and India. It assumes that the coffee has been grown under irrigated conditions with mineral NPK fertiliser, pesticides and with the use of heavy machinery. Kua's coffee is produced in Uganda by smallholder farmers in a low-fi, non-mechanised, mostly organic way.</p> <p>Hence, while values are true and accurate, resultant emissions factors are likely inflated.</p>
Scenario	While parameter uncertainty is a measure of how close the data used to calculate emissions are to the true (though unknown) actual data and emissions, scenario uncertainty refers to variation in calculated emissions due to methodological choices.	<p>Most data was collected for the entire PoM but in some cases, was measured for a shorter period of time (generally due to data availability and time constraints) and then estimated for the PoM. This is a methodological choice that causes a level of scenario uncertainty for some activities (noted in the Data Collection tab).</p> <p>Our methodology for calculating all emissions was to convert units for the PoM in Earthster. As described in the Calculation section above, 'sometimes when you're looking for apples, you might need to choose fruit' ( Dr Gregory Norris) so while the methodology was consistent, a 'perfect-fit' emissions process was not always available for every activity.</p>

**12. Assurance**

First or third party assurance has not been officially conducted for this assessment due to limited financial resources but Dr Gregory Norris has guided the process and is confident that the inventory and report are complete, accurate, consistent, transparent, relevant, and without material misstatements.